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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/875,177	06/06/2001	Joseph Lincoln Komen	24484	7704

28624 7590 08/13/2003

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EXAMINER
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WHITE, EVERETT NMN

ART UNIT	PAPER NUMBER
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1623

DATE MAILED: 08/13/2003

10

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/875,177

Applicant(s)

KOMEN ET AL.

Examiner

EVERETT WHITE

Art Unit

1623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 02 June 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-79 is/are pending in the application.
- 4a) Of the above claim(s) 3,49 and 77 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7,30-42,46-48,50-54 and 57-63 is/are rejected.
- 7) ☒ Claim(s) 8-29,43-45,55,56,64-76,78 and 79 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☒ Interview Summary (PTO-413) Paper No(s). 8.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_. 6) ☐ Other:

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### DETAILED ACTION

1. The amendment filed June 2, 2003 has been received, entered and carefully considered. The amendment affects the instant application accordingly:
  - (A) Comments regarding Office Action have been provided drawn to
    - (i) 112, 2<sup>nd</sup> paragraph rejection, which has been withdrawn.
    - (ii) 103(a) rejection, rendered moot by new ground of rejection over newly cited US Patent.
2. Claims 1-79 are pending in the case.
3. Claims 3, 49 and 77 have been withdrawn in compliance with the species requirement set forth in Paper No. 4.
4. The text of those sections of title 35, U. S. Code not included in this action can be found in a prior Office action.

### *Election/Restrictions*

5. Applicant's election of species, which include cellulose as the carbohydrate product, nitroxides of the heterocyclic oxammonium salts as the primary oxidants, chlorine dioxide as the secondary oxidant, and a chlorine dioxide/hydrogen peroxide mixture as the tertiary oxidant in Paper No. 4 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Upon the allowance of a generic claim, Applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of the allowed generic claim as provided by 37 CFR 1.141.

Claims drawn to the elected species are Claims 1, 2, 4-48, 50-76, 78 and 79.

Claims 3, 49, and 77 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 4 since Applicants did not distinctly and specifically point out the supposed errors in the restriction requirement.

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The species requirement has been made Final.

***Claim Rejections - 35 USC § 103***

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1, 2, 4-7, 30-42, 46-48, 50-54 and 57-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Besemer et al (WO 95/07303, already of record) in view of Ashida et al (US Patent No. 5,824,462, newly cited) or Chen et al (US Patent No. 4,480,089, newly cited).

Applicants claim a method of making a carboxylated carbohydrate product which comprises: oxidizing a carbohydrate compound by reacting it in an aqueous system with a sufficient amount of a primary oxidant selected from the group consisting of hindered heterocyclic oxammonium salts in which the carbon atoms adjacent the oxammonium nitrogen lack  $\alpha$ -hydrogen substitution, the corresponding amines, hydroxylamines, and nitroxides of these oxammonium salts, and mixtures thereof, and a secondary oxidant selected from chlorine dioxide and latent sources of chlorine dioxide in a sufficient amount to induce an increase in carboxyl substitution in the carbohydrate of at least 2 meq/100g. Additional limitations in the dependent claims include characterizing the carbohydrate as cellulose and starch; specific types of nitroxides; pH of the aqueous system; the amount of primary oxidant; the time of initial oxidation step; treating the carboxylated cellulose fibers with a tertiary oxidizing agent; and treating the carboxylated cellulose fibers with a reducing agent.

The Besemer et al patent discloses a method for oxidizing carbohydrates by treatment with a hypohalite in the presence of a catalytic amount of a ditertiary-alkyl nitroxyl (see abstract). Besemer et al discloses that the carbohydrate may be selected

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as cellulose and starch (see page 5, 1<sup>st</sup> paragraph), which embraces the cellulose and starch of the instant application. In the abstract, the Besemer et al patent discloses that the ditertiary-alkyl nitroxyl may be 2,2,6,6-tetramethylpiperidin-1-oxyl, which embraces the nitroxides of the heterocyclic oxammonium salts of the instantly claimed invention. The abstract sets forth the amount of nitroxyl to range from 0.1 to 2.5 %, which embraces the amount of primary oxidant used in the instantly claimed invention. The first paragraph of page 4 also discloses the amounts of secondary oxidants that can be used in the Besemer et al patent, which embraces the amount of secondary oxidants used in the instantly claimed invention. The abstract discloses that the oxidation process is carried out in a water-containing medium at pH 9-13 and indicates that the oxidation leads to products having a high content (greater than 90%) of carboxyl groups, without significant chain breakdown. This statement embraces the pH, aqueous system and the amount of carboxyl substitution in the carbohydrates indicated in the instantly claimed invention. The instant claims differ from the Besemer et al patent by claiming that the secondary oxidant is chlorine dioxide or a latent source of chlorine dioxide wherein the Besemer et al patent uses a hypohalite as the secondary oxidant such as sodium hypochlorite. However, the Ashida et al patent, which discloses resin-coated paper and preparations thereof, shows that the substitution of chlorine dioxide with a hypochlorite is known in the art. See column 12, 3<sup>rd</sup> paragraph, wherein Ashida et al teaches a bleaching treatment of wood pulps - which are used to prepare the resin-coated paper, with various types of agents that include a hypochlorite or chlorine dioxide.

The Chen et al patent, which discloses modified cellulose products by bleaching, also suggests the substitution of chlorine dioxide with other bleaching agents that include sodium hypochlorite (see column 2, 2<sup>nd</sup> paragraph).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the hypohalite used in the oxidation of carbohydrates in the process of the Besemer et al patent with chlorine dioxide in view of the recognition in the art, as evidenced by the Ashida et al and Chen et al patents, that

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chlorine dioxide can be used effectively to oxidized pulp or cellulose to produce a bleached product and to remove impurities.

A person of ordinary skill in this art would be motivated to combine the teachings of the Ashida et al patent and Chen et al patent with that of the Besemer et al patent since all the patents set forth a bleaching or oxidation procedure of a carbohydrate.

8. Applicant's arguments with respect to Claims 1, 2, 4-7, 30-42, 46-48, 50-54 and 57-63 have been considered but are moot in view of the new ground(s) of rejection.

9. Claims 41, 54, and 57-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Besemer et al (already of record) in view of Ashida et al (newly cited) or Chen et al (newly cited) as applied to Claims 1, 2, 4-7, 30-42, 46-48, 50-54 and 57-63 above, and further in view of Tang et al (US Patent No. 4,401,810, already of record).

Applicants claim a method of making a carboxylated carbohydrate product which comprises: oxidizing a carbohydrate compound by reacting it in an aqueous system with a sufficient amount of a primary oxidant selected from the group consisting of hindered heterocyclic oxammonium salts in which the carbon atoms adjacent the oxammonium nitrogen lack  $\alpha$ -hydrogen substitution, the corresponding amines, hydroxylamines, and nitroxides of these oxammonium salts, and mixtures thereof, and a secondary oxidant selected from chlorine dioxide and latent sources of chlorine dioxide in a sufficient amount to induce an increase in carboxyl substitution in the carbohydrate of at least 2 meq/100g, wherein the method further comprises treating the carboxylated cellulose fibers with a tertiary oxidizing agent to stabilize the product by substantially converting any aldehyde substituents to additional carboxyl groups.

The information set forth in the Besemer et al patent and the Ashida et al or Chen et al patents in the above rejection of the claims under 35 U.S.C. 103 is incorporated into the instant rejection of Claims 41, 54, and 57-61. The instant claims differ from the Besemer et al patent by disclosing further treatment of the carboxylated cellulose fibers with a reducing agent. In the background section of the invention, the Tang et al patent shows that the use of a reducing agent with cellulose material is well known in the art. See column 2 lines 39-42 of the Tang et al patent, whereby Tang et

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al, for background information about the invention thereof, refers to Canadian Pat. No. 610,655 as a reference, which discloses the use of a reducing agent, such as sodium borohydride, to improve the color stability of cotton linters, which have been bleached with sodium hypochlorite. Cotton linters embrace cellulose since cellulose is contained therein.

A person of ordinary skill in this art would be motivated to combine the teachings of the Besemer et al patent and Ashida et al or Chen et al patents with the teachings of the Tang et al patent for a rejection of the claims under 35 U.S.C. 103 since all the patents disclose procedural steps for oxidizing cellulose material and the skilled artisan would seek to optimize oxidation procedures for said cellulose material.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a method of making a carboxylated cellulose product by oxidizing the cellulose as disclosed in the Besemer et al patent in view of the Ashida et al or Chen et al patents to further treat the carboxylated cellulose with a reducing agent in view of the recognition in the art, as evidenced by Tang et al patent, that use of a reducing agent improves the color stability of oxidized cellulose products.

10. Applicant's arguments with respect to Claims 41, 54, and 57-61 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Claims Objected to***

11. Claims 8-29, 43-45, 55, 56, 64-76, 78 and 79 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Summary***

12. Claims 1, 2, 4-7, 30-42, 46-48, 50-54 and 57-63 are rejected; Claims 8-29, 43-45, 55, 56, 64-76, 78 and 79 are objected to; Claims 3, 49 and 77 are withdrawn from consideration.

***Examiner's Telephone Number, Fax Number, and Other Information***

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13. For 24 hour access to patent application information 7 days per week, or for filing applications, please visit our website at [www.uspto.gov](http://www.uspto.gov) and click on the button "Patent Electronic Business Center" for more information.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Everett White whose telephone number is (703) 308-4621. The examiner can normally be reached on Monday-Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James O. Wilson, can be reached on (703) 308-4624. The fax phone number for this Group is (703) 308-4556.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-1235.



E. White



KATHLEEN K. FONDA  
PRIMARY EXAMINER

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James O. Wilson  
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